

What's behind the rise in profitability in the US in the 1980s and 1990s?

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Profitability in the US has been rising since the early 1980s and by 1997 was at its highest level since its post-World War II peak in the mid-1960s, and the profit share, by one definition, at its highest point. In this paper, I examine the role of the change in the profit share and capital intensity, as well as structural change, on movements in the rate of profit between 1947 and 1997. Its recent recovery is traced to a rise in the profit share in national income, a slowdown in capital–labour growth at the industry level, and employment shifts to relatively labour-intensive industries.

Key words: Profits, Wages, Labour productivity, Surplus value

JEL classifications: P17, E11, J30

Introduction

The recent surge in the stock market has called attention to movements in the underlying rate of profit. Over the last decade and a half, profitability in the total private sector has trended upwards, and by 1997, according to some definitions, it was coming close to its post-World War II peak of the mid-1960s. Even in the corporate business sector, the average rate of return earned on the value of its plant, machinery, and equipment, valued at current cost, declined from a post-World War II high of 17% in 1950 to under 5% in 1986 but has since risen to 9.6% in 1997.

The crude evidence does suggest that stock prices are linked to corporate profitability. While corporate profitability remained high, from the late 1940s through the late 1960s, the S&P 500 index, deflated to 1995 dollars, increased rather steadily over time. As corporate profits slipped during the 1970s until the early 1980s, so did the S&P 500 index in real terms (both reached a low point in 1982). After 1982, both corporate profits and the S&P 500 index recovered quite strongly. Figure 1, for example, shows the annual change in the corporate profit rate together with the annual change in the S&P 500 index, deflated to 1995 dollars. The simple correlation between the two series from 1950 to 1997 is 0.42.

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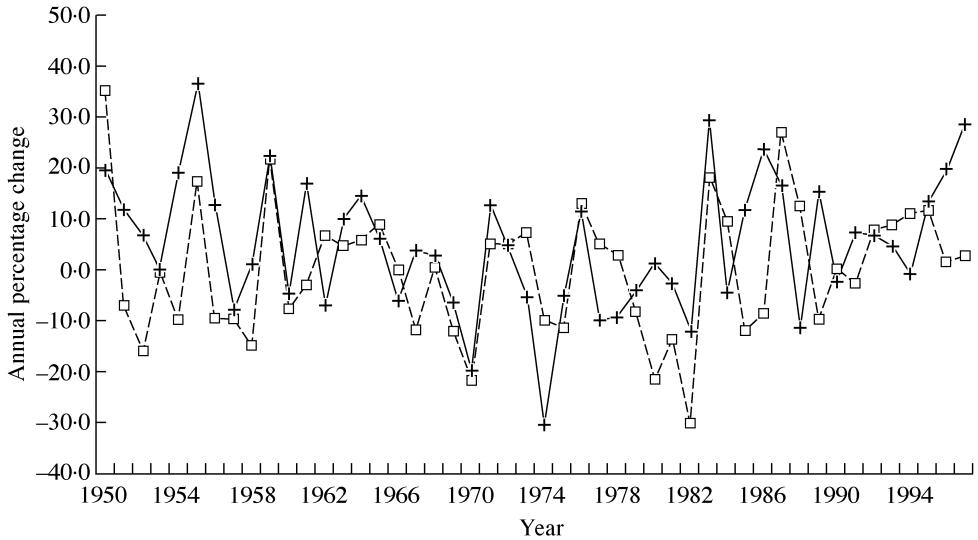


Fig. 1. Annual percentage change in the corporate profit rate and the annual percentage change in the S&P 500, deflated to 1995\$, 1950–97: ■, corporate profit rate; +, S&P 500 (in 1995\$).

Movements in the rate of profit have long occupied Marxian economists. Marx himself argued that the rate of profit would tend to decline over the long run. His ‘law of the tendency of the rate of profit to fall’ states that, over time, the organic composition of capital (the ratio of capital valued in nominal terms to the wage bill) would rise, thereby causing the general rate of profit to fall (*Capital*, vol. 3, ch. 13). This law has been subject to criticism on theoretical grounds (see, for example, Okishio, 1961; Samuelson, 1971; Roemer, 1977; Bowles, 1981), though the more recent literature has reversed some of these theoretical criticisms (see Foley, 1986; Michl, 1994; Thompson, 1995; Laibman, 1996).

Despite the theoretical disagreements, Marx’s theory does provide a useful framework in which to analyse factors which affect movements in the rate of profit, and many papers have done this. The earlier ones looked into the factors responsible for what seemed to be a secular decline in profitability in the US, from the late 1940s to the mid-to-late 1980s (see, for example, Wolff, 1979, 1986; Weisskopf, 1979; Dumenil *et al.*, 1987; Moseley, 1988; Michl, 1988; Shaikh and Tonak, 1994). The recent rise in corporate profitability has been discussed by Baker (1996) and Poterba (1998). Dumenil and Lévy (2000A) also provide evidence of rising profitability since the early 1980s using a definition of the rate of profit roughly similar to mine.

The results reported here on overall profitability trends line up quite closely with those of Weisskopf (1979) for the pre-1980 period and with those of Dumenil and Lévy (2000A) for the entire post-World War II period.¹ Dumenil and Lévy (2000B) also provide time trends on the profit rate for Germany, the UK, and particularly France. All three countries, like the US, show declines in profitability from 1960 to the early 1980s and a sharp reversal through the late 1990s.

¹ In addition, Dumenil and Lévy show profit trends for various sub-sectors of the private economy, including financial and non-financial business, capital intensive and non-capital intensive industries, and major sectors of the economy.

One of the more interesting articles on this subject to appear in recent years is by Brenner (1998). He concentrates on the fall in the economy-wide rate of profit in the US from the early post-World War II period to the late 1970s. He notes first that the rate of profit in manufacturing during the early post-World War II period was higher than in other sectors of the economy but fell more over this period. He argues that the declining profit rate in manufacturing was precipitated by intense international competition with German and Japanese manufacturing firms. Like Brenner, I also find that in 1947 the net rate of profit (see below for the definition) was higher in manufacturing (23.8%) than in the total economy (17.1%). According to my calculations, the net rate of profit in US manufacturing shows a very similar trend to that of the total economy, first falling from a peak of 32.3% in 1951 to a low point of 8.3% in 1983 and then recovering, in part, to 15.9% in 1997. Brenner also recognises the remarkable recovery in US profitability within manufacturing in the 1980s and 1990s, particularly since the mid-1980s.¹

In this paper, I try to account for the recent rise in the profit rate. To make the analysis more accessible, I use a conventional national accounting framework, with analogues to some of the concepts developed in the Marxian framework. I also explore one particular factor that has received relatively little attention in the literature—namely, the role of structural change on movements in the rate of profit. Marx himself noted the importance of structural shifts in volume 3 of *Capital*: ‘Since the general rate of profit is not only determined by the average rate of profit in each sphere, but also by the distribution of the total social capital among the different individual spheres, and since this distribution is continually changing, it becomes another constant cause of change in the general rate of profit’ (p. 169). Moreover, ‘new lines of production are opened up, especially for the production of luxuries, and it is these that take as their basis this relative over-population, often set free in other lines of production through the increase of their constant capital. These new lines start out predominantly with living labour, and by degrees pass through the same evolution as the other lines of production. In either case, the variable capital makes up a considerable portion of the total capital . . .’ (p. 237). Differential growth in the various sectors of the economy may thus have important effects on the movement of the rate of profit over time.

The particular mechanism I investigate here is the effect of uneven development on the organic composition of capital, defined here as the ratio of the capital stock in current prices to total wages. Marx argued that it would generally increase over time because of the substitution of fixed capital for labour. However, he noted the presence of several counteracting forces. One was the continual devaluation of capital due to technical change. Another, which we focus on here, is the uneven development among the sectors of the economy. As Marx suggested, the organic composition tends to increase within the various branches of the economy, particularly within manufacturing. However, sectors grow at different rates over time. If employment shifts towards sectors which have a relatively low organic composition, then this will act to depress the economy-wide organic composition.

I investigate the period from 1947 to 1997 in the US. I find, as in previous work (Wolff, 1979, 1986) that there was very little net change in the economy-wide organic composition of capital over the period from 1947 to 1997. The trend was not continuous over time, and there were periods when the organic composition increased quite sharply.

¹ Brenner attributes the turnaround in profitability since the mid-1980s to ‘historically-unprecedented repression of wage growth’ and the ability of US manufacturers to ‘achieve major gains in international competitiveness’ through the devaluation of the dollar.

Moreover, I find that the profit rate, based on a variety of measures, fell between 1947 and the early 1980s and then recovered after that. The decline in the earlier period is traceable to rising capital–labour ratios on the industry level and a decline in the profit share, and the recent recovery to a slowdown in capital–labour growth and a rising profit share. Employment shifts were found to be an important counteracting influence to a falling rate of profit, and without such structural change, the rate of profit would have declined substantially over the half century.

The paper is divided into five parts. Section 1 develops the accounting framework and definitions of the variables. In Section 2, I present recent evidence on trends in the rate of profit and the profit share in national income. Section 3 presents results on movements of the organic composition of capital and other factors influencing aggregate changes in profitability. Section 4 analyses the effect of sectoral shifts on movements in the rate of profit. Concluding remarks are made in the last section, as well as some broader implications of the results.

1. Accounting framework and definitions of variables

The basic data are the National Income and Product Accounts for the US, supplemented with data on private non-residential fixed capital stock. All the data are available on the Bureau of Economic Analysis's website (www.bea.gov/bea/dn/nipaweb). The variables are defined as follows:

\mathbf{Y} is the row vector of national income generated by industry in 1992 dollars.

$y = \Sigma \mathbf{Y}_i$ is a scalar of total national income in the economy in 1992 dollars.

\mathbf{L} is the row vector of employment by industry.

$n = \Sigma \mathbf{L}_i$ is a scalar of total employment in the economy.

\mathbf{K} is the row vector of non-residential fixed capital stock by industry in 1992 dollars.

$k = \Sigma \mathbf{K}_i$ is a scalar of total non-residential fixed capital stock in the economy in 1992 dollars.

w is the average compensation for employees and self-employed workers, including fringe benefits, in nominal terms (current dollars).

p_y is the inverse of the national income price deflator.

$\pi = p_y y - wn$ is total profits in the economy in nominal terms.

p_k is the the inverse of the price deflator for non-residential fixed capital.

\mathbf{s} is the row vector showing the distribution of employment among sectors (that is, employment shares), where $s_i = \mathbf{L}_i/n$.

The ratio of total profits to total worker compensation (the 'rate of surplus value') is defined as

$$\varepsilon = \pi/wn \quad (1)$$

It should be stressed at the outset that the definition of the wage bill used here includes both wage and non-wage compensation for employees and an allocated portion of the income of self-employed workers. The economy-wide 'organic composition of capital' θ is given by

$$\theta = p_k k/wn \quad (2)$$

The standard capital–labour ratio (the 'technical composition of capital'), τ , is given by

$$\tau = k/n \quad (3)$$

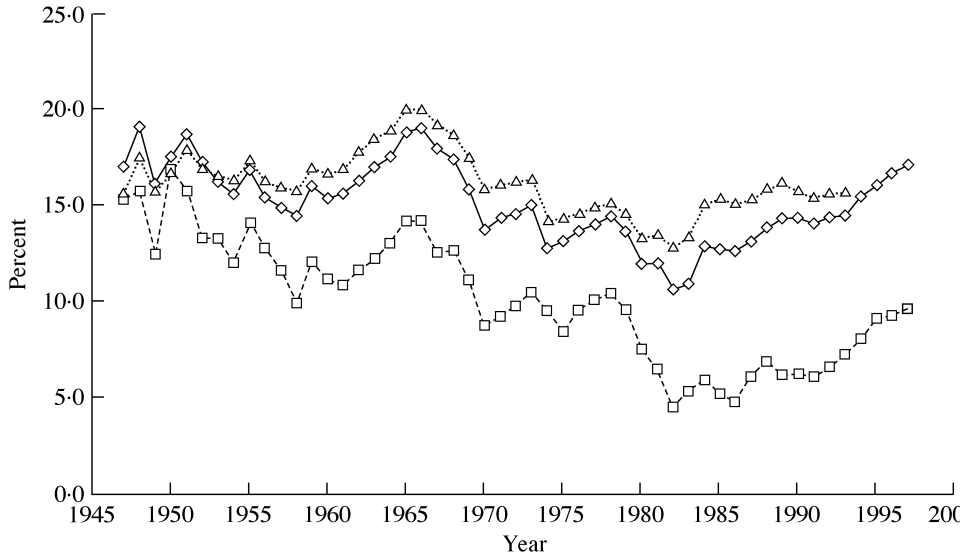


Fig. 2. Trends in the rate of profit, 1947–97: \diamond , net profit rate, private economy; \triangle , gross profit rate, private economy; \square net profit rate, corporate sector.

The relation between the organic and technical composition of capital can be derived as

$$\theta = \tau(p_k/zw) \tag{4}$$

The rate of profit r is defined as

$$r = \pi/p_k k \tag{5}$$

Here it should be noted that the rate of profit is defined as the ratio of profits to the current dollar value of capital.¹

2. Post-World War II trends in profitability

Trends in profitability are shown in Figure 2. The different measures correspond to alternative definitions of surplus income and total national income. I use both gross and net profits, where the former includes the capital consumption allowance (CCA), which is the national accounting measure of depreciation, while the latter does not. Net capital stock is used in the denominator with net profits, since it is close to the ideal of the (net) replacement cost of capital. Likewise, gross capital is used with gross profits to compute the gross profit rate. This capital series run to 1993, at which time it was abandoned by the Bureau of Economic Analysis. Two sectoral definitions are also used for conventional profit rates: (1) the corporate sector and (2) the private business (non-governmental) sector.² The results show a remarkable degree of congruity in profitability trends.

¹ In a strict Marxian framework, the rate of profit is defined as the ratio of surplus income to the total capital advanced per turnover period, including not only the value of fixed capital but also the value of intermediate inputs and the wage bill. Unfortunately, these data are not available on a consistent basis for the full time period covered in the analysis. See Wolff (1979) for further discussion.

² Owing to data limitations, it is not possible to separate out the non-profit and non-for-profit sectors. However, the private household sector is excluded, since, by construction, there is no capital advanced in this sector.

The first series shows the ratio of corporate before-tax income to the net capital stock owned by the corporate sector. After a rather moderate increase, from 15.4% in 1947 to 16.9% in 1950, corporate profitability plummeted to 9.9% in 1958 (a recession year). It then recovered to 14.2% in 1966 but slid downward almost continuously over the next two decades, finally bottoming out at 4.6% in 1982. Corporate profits have since showed a strong recovery, reaching 9.6% in 1997.

In the second series, total net property-type income, including corporate profits, net business interest, business rental income and the 'profit portion' of proprietors' income, is used as the numerator and total private fixed capital as the denominator (see the Appendix for technical details). The treatment of proprietors' (self-employment) income is always problematic, since it includes both a labour component and a profit component. I have estimated the labour portion by multiplying the number of self-employed workers by the average employee compensation of salaried workers. The profit portion is the residual part of proprietors' income.

This series exhibits a very similar trend to that of the corporate profit rate. The net profit rate for the total economy rose from 17.1% in 1947 to 18.8% in 1951, fell to 14.5% in 1958, climbed to its post-World War II peak of 19.1% in 1966, dropped to its low point of 10.7% in 1982, and then recovered to 17.3% in 1997. All told, corporate profitability fell by over 11 percentage points between 1947 and 1982 and the second series by 6 percentage points. The first series shows a 5 percentage point gain between 1982 and 1997 and the second series a 7 percentage point growth.¹

A third measure, shown for comparison, is the ratio of gross profits to gross capital stock. It has a similar time trend. It experienced a 3 percentage point decline from 1947 to 1982, followed by a 3 percentage point recovery by 1993, the last date available for this series.²

One conclusion that is already apparent from a comparison of trends in the net and gross profit rate is that the CCA has been rising as a fraction of gross profits—in the total private sector, from 0.17 in 1947 to 0.32 in 1997 as a share of property-type income. This may partly reflect a shift in the composition of capital away from structures and towards machinery and equipment, which have shorter life spans and a higher depreciation rate than structures. In fact, the share of machinery and equipment in total fixed private net capital (both in current dollars) has risen from 25% in 1947 to 37% in 1997. However, this compositional shift is not sufficient to explain the entire rise in the CCA, so its increase might also reflect liberalised accounting rules and the fact that CCA represents a deduction from business income taxes (both corporate and non-corporate). Thus, more of total profits may now be 'hidden' in the CCA.

Figure 3 shows trends in both the net and gross profit share in national income.³ The first is net property-type income as a fraction of net national income.⁴ It declined by 6

¹ Data on the total value of intermediate inputs are available on an annual basis beginning in 1977. Including intermediate inputs in the definition of total capital advanced does not alter the general time trends in profitability. The net rate of profit now declines from 8.5% in 1977 to its low point of 6.8% in 1982 and then rises to 10.8% in 1997.

² The correlation coefficient between the net and gross profit rate series is 0.90. This reflects the fact that the net and gross capital stock move very closely together (their correlation coefficient is 0.99).

³ Unfortunately, on the basis of national accounting data, value added is not provided separately for the corporate and non-corporate sectors. So while it is possible to compute the profit rate for the corporate sector (on the basis of corporate profits and the corporate capital stock), it is not possible to compute the corporate profit share. This is unfortunate, since firm behaviour is more closely tied to movements in corporate profitability than to trends in the broader concept of profitability used here.

⁴ Technically, 'National Income' is net of depreciation. However, to emphasise this point, I shall use the expression 'net national income'

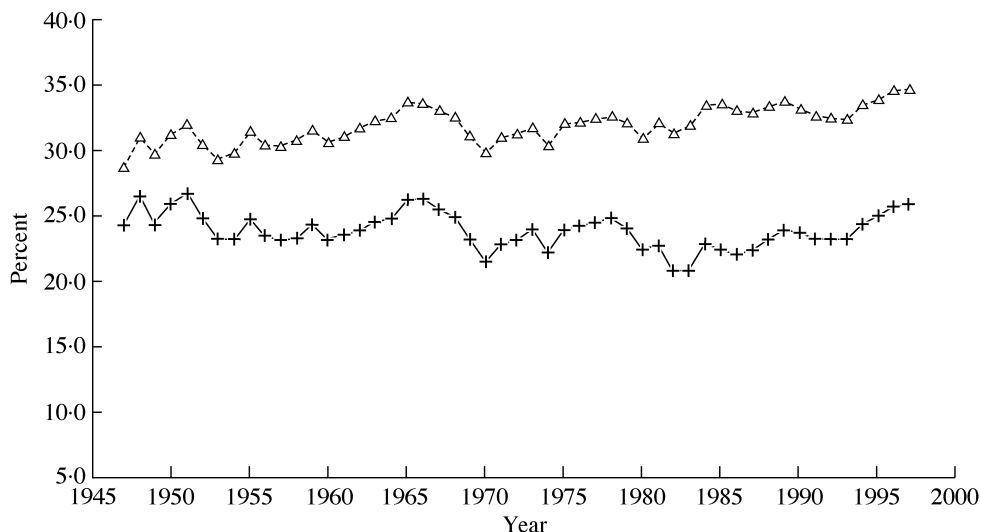


Fig. 3. Trends in the profit share, 1947–97: Δ , gross profit share; +, net profit share.

percentage points between its peak level of 27.0% in 1951 and its nadir of 21.3% in 1982 but then almost fully recovered to 26.4% in 1997. Part of this recovery reflects the fact that net interest increased as a share of GDP, from 1.1% in 1947 to 7.6% in 1997.

The second index, gross property-type income (including CCA) as a fraction of gross national income (including CCA), generally drifted upwards over the post-World War II period, rising by 6 percentage points between 1947 and 1997. This mainly reflects the rising fraction of CCA in gross profits and the rising share of net interest in total national income. Indeed, according to this, the most inclusive, definition, the profit share was at its post-World War II peak in 1997.

Which definition of profits makes the most sense? The Bureau of Economic Analysis proposes a measure which includes traditional corporate profits, total proprietor's income, net interest, dividends, rent and the CCA as their preferred concept of the profit share. I have modified this slightly by excluding the 'labour portion' of proprietors' income (PTI). I think that this is the closest market price equivalent to Marx's concept of surplus value, since Marx included both interest and rent in surplus income (see *Capital*, vol. 3, ch. 21–8, 37–47). The inclusion of net interest, in particular, in the measure of surplus income does have the advantage of making the measure of profitability insensitive to changes in corporate financing. For example, suppose that a corporation has no outstanding debt and the ratio of its net profits to its net capital stock is x . If the firm then issues bonds for a certain percentage of its equity and pays out interest on its debt, corporate profits will decline and its net profit rate will fall below x , even if there were no changes in sales or other expenses. In this accounting framework, interest payments are treated as a transfer of surplus income from the corporation to the holders of corporate debt.

I also believe that the 'true' measure of surplus income lies between net and gross profits, because the CCA is likely to be overstated in more recent years. However, to be on the conservative side (and because the only series available for the full period is net capital stock), I will use net profits in the remaining part of the paper.

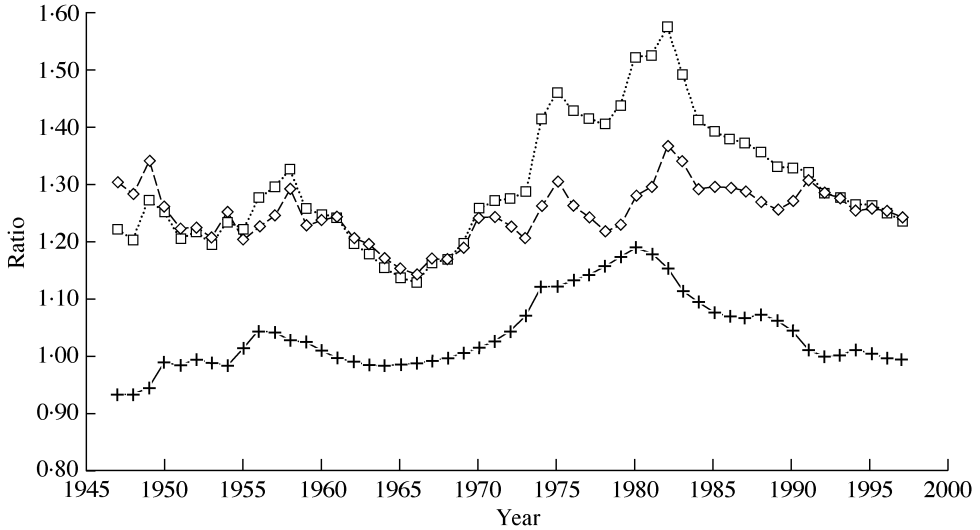


Fig. 4. Capital-output ratios and the capital price deflator relative to the GDP deflator, 1947–97: ■, capital output ratio, current \$; +, capital price deflator/GDP deflator; ◆, capital/output ratio, 1992\$.

3. Deconstructing trends in the profit rate

3.1 The capital-output ratio

I next look at the underlying factors affecting movements in aggregate profitability. From (5), it follows that

$$r = \pi/p_k k = (\pi/p_y y)(p_y y/p_k k) \tag{6}$$

where $\pi/p_y y$ is the share of total profits in national income, and $p_y y/p_k k$ is the capital-output ratio in nominal terms. The rate of profit thus moves proportionately to the profit share but inversely to the capital-output ratio in value terms.

Figure 4 shows that the capital-output ratio in value terms rose rather gradually between 1947 and 1958, from 1.22 to 1.33, fell to its low point of 1.13 in 1966, increased sharply thereafter, reaching a peak value of 1.57 in 1982 and then declined rather continuously to 1.23 in 1997. It is clear that movements in the rate of profit parallel those of the capital-output ratio, falling between 1947 and 1958, rising from 1958 to 1966, falling through the early 1980s and then trending upwards thereafter. However, swings in the profit rate are much steeper than corresponding shifts in the capital-output ratio. Moreover, whereas the capital-output ratio is almost the same in 1997 as in 1947, profit rates are lower in the later year.

From (6), it is possible to decompose movements in the capital-output ratio in value terms into two effects, as follows

$$p_y y/p_k k = (y/k)(p_y/p_k) \tag{7}$$

The first term of (7) is the capital-output ratio in constant dollars and the second term the price of capital goods relative to the average price level (that is, the GDP price deflator).

Between 1947 and 1958, there was virtually no change in the capital-output ratio in constant dollars, but the price of capital goods relative to GDP rose from 0.94 to 1.03, causing the capital-output ratio in value terms to rise. Both the capital-output ratio in

constant dollars and the relative price of capital goods fell between 1958 and 1966, causing a drop in the capital–output ratio in current values. From 1966 to 1982, a sharp rise in both factors caused an even steeper rise in the capital–output ratio in value terms, which peaked in 1982. After 1982, the two factors generally trended downwards, causing the capital–output ratio in value terms to decline. Interestingly over the half century from 1947 to 1997, there was almost no net change in the capital–output ratio in value terms, only a slight increase in the relative price of capital goods, and a slight decline in the capital–output ratio in constant dollars.

3.2 The ratio of profits to worker compensation

Since it is hard to analyse movements in the capital–output ratio directly, a somewhat more illuminating decomposition of the rate of profit can be obtained as follows:

$$r = \pi/p_k k = (\pi/wn)/(p_k k/wn) = \varepsilon/\theta \tag{8}$$

where $\varepsilon = \pi/wn$ is the ratio of total profits to total worker compensation (or ‘wages’ for short) and $\theta = p_k k/wn$ is the organic composition of capital—the ratio of the capital advanced in nominal terms to the total wage bill. We can then treat the two terms of equation (8) separately.

The first term can be further decomposed as follows:

$$\varepsilon = \pi/wn = (p_y y - wn)/wn = (p_y y/wn) - 1 = (y/n)/[(w/p_c)(p_c/p_y)] - 1 \tag{9}$$

where y/n is labour productivity, p_c is the consumer price index (CPI), w/p_c is the real wage (average nominal wages deflated by the CPI), and p_c/p_y is the ratio of the CPI to the GDP price index. As long as consumer prices move in tandem with the general price level, the ratio of total profits to total wages will increase (decrease) if labour productivity rises faster (slower) than the real wage.

Movements of the variables are shown in Figure 5. Productivity is measured as the ratio of net national income in 1992 dollars to employment (persons engaged in production),

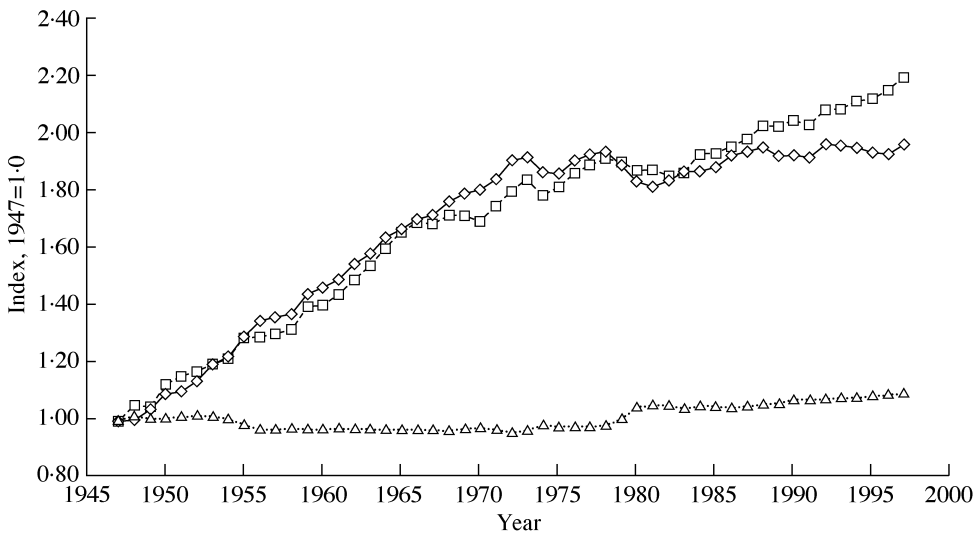


Fig. 5. Labour productivity, mean compensation, and the CPI relative to the GDP deflator, 1947–97: ■, labour productivity—NNI (1992\$)/PEP; ◆, mean compensation (1992\$); △, CPI/GDP deflator.

which corresponds to the net profit share. Between 1947 and 1979, real wages grew, on average, at the same rate as labour productivity. Over the same period, consumer prices increased at the same rate as the overall price level, causing no (net) change in the net profit share. However, from 1979 to 1997, real wages rose more slowly than labour productivity and, though consumer prices increased relative to the GDP deflator, the net profit share rose. Over the entire 1947–97 period, labour productivity gains outstripped those of mean compensation (a ratio of 2.19 versus 1.96) and the CPI also rose relative to the GDP deflator though the difference was more muted (a ratio of 1.09), so that the net profit share grew by 1.9 percentage points.

3.3 *The organic composition*

The second term of equation (8) can also be decomposed, as follows:

$$\theta = p_k k / w n = (k/n)(p_k/w) \quad (10)$$

The first term of equation (10) is the conventional capital–labour ratio. The second term, p_k/w , indicates how much wages must be paid in order to obtain one unit of capital. It is like the average labour content of capital, except in wage terms instead of labour terms.¹ In so far as wages tend to move with overall labour productivity, this term principally reflects the falling amount of labour (both direct and indirect) required to produce one unit of capital. When advances in the capital–labour ratio outstrip the effects of labour productivity growth in reducing the labour content of capital, then the organic composition will rise, and conversely.

Both standard neoclassical analysis and Marxian theory (vol. 3 of *Capital*) argue that the capital–labour ratio will generally rise over time. This is principally a result of a rising real wage, which will induce firms to substitute physical capital for labour. A second reason is that, even without higher real wages, more physical capital-intensive technology may be absolutely more productive than labour-intensive technology. Firms can thus lower costs by investing in the more capital-intensive technology.

The increase in the capital–labour ratio will cause labour productivity to increase for two reasons. First, the increase in the physical capital–labour ratio will cause output per person hour to rise.² Second, in so far as new investment embodies new technology, labour productivity will rise. An increase in labour productivity will, in turn, cause total (direct plus indirect) labour requirements to decline per unit of capital and thus the ratio p_k/w to fall. Interestingly, Marx saw this offsetting effect as relatively minor. However, as we shall see, the fall in the labour content of physical capital has been almost as great as the rise in the capital–labour ratio.

Figure 6 shows trends in the organic composition of capital. As is evident, there is no strong secular pattern. After rising from 1.90 in 1947 to 2.13 in 1958, the organic composition fell to 1.90 in 1966, reversed direction and reached its peak of 2.53 in 1982, and then retreated to a value of 2.07 in 1997. Over the entire half century, there was a slight increase in the organic composition of capital.

Between 1947 and 1958, the capital–labour ratio grew by 36%, whereas the ratio of the capital price level to nominal wages fell by only 18%, causing a sharp increase in the organic composition. From 1958 to 1966, the rate of decline of the labour content of capital exceeded that of the growth of the capital–labour ratio and the organic compo-

¹ This concept is also equivalent to Adam Smith's (1776) labour commanded measure of real value.

² For example, in the case of an aggregate Cobb–Douglas production function of the form $y = n^\alpha k^{(1-\alpha)}$, where α is less than one, labour productivity is given by: $y/n = (k/n)^{(1-\alpha)}$.

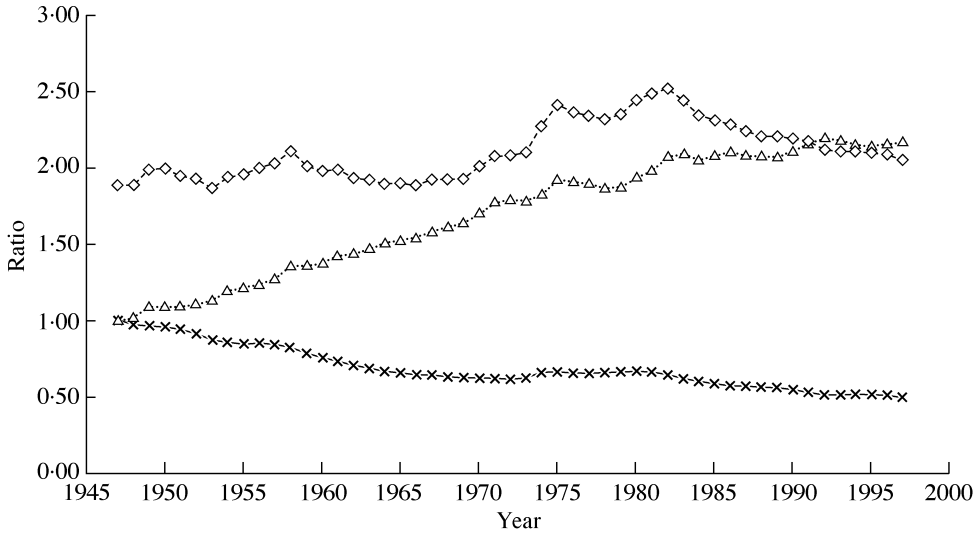


Fig. 6. Capital–labour ratio and the organic composition of capital, 1947–97: Δ , capital/labour ratio; \times , capital deflator/nominal wage; \blacklozenge , organic composition.

sition slipped back to its 1947 level. Between 1966 and 1982, capital–labour growth was much stronger than the productivity growth in producing capital, causing a sharp jump in the organic composition, and from 1982 to 1997, the reverse occurred. Over the entire half century, the labour content of capital fell by half but the capital–labour ratio more than doubled, causing a moderate increase in the organic composition of capital.

3.4 Decomposition of changes in profitability

Tables 3 and 4 present a formal decomposition of changes in the rate of profit into its constituent components: wage changes, productivity growth, movements in the capital–labour ratio and changes in the ratio of the price of capital to wages. These are based on equations (8)–(10). From (10), for example, we obtain:

$$d\theta = d\tau(p_k/w) + \tau d(p_k/w) \tag{11}$$

where $\tau = k/n$. Because we use discrete time periods, the differential form of equation (11) must be modified. Various choices of weights are possible. I use average period weights, because they give an exact decomposition.¹

As might be apparent from Figure 1, profit rates are very sensitive to the business cycle, rising during expansions and falling during contractions (for example, the lowest profit rate occurred in 1982, coincident with the deep recession of that year). As a result, I have chosen five years that are roughly at the same point in the business cycle.² Since the data begin in 1947, I have selected years that are slightly below the peak of the business cycle: 1947, 1966, 1979 and 1997 (which, quite coincidentally, is also the last year of my data series):

¹ In general, if $y = ab$, then $y^2 - y^1 = a^*(b^2 - b^1) + b^*(a^2 - a^1)$, where superscripts represent time periods and $a^* = (a^2 + a^1)/2$ and $b^* = (b^2 + b^1)/2$.

² An alternative approach is to cyclically adjust the profit rate. However, this procedure is much more difficult and open to dispute.

Year	Civilian unemployment rate
1947	3.9
1948	3.8 Peak
1956	4.1 Peak
1957	4.3
1966	3.8
1969	3.5 Peak
1974	5.6 Peak
1979	5.8
1997	4.9
1998	4.5

It is first of interest to look at the bottom section of Table 1. The growth in real wages shows a marked slowdown in the 1967–79 period and again in the 1979–97 period. Labour productivity growth also slowed down during the 1967–79 period, compared with the previous 19 years, but remained relatively unchanged between the 1967–79 and the 1979–97 periods. During the periods before 1979, real wages increased at about the same rate as labour productivity, accounting for the fact that the net profit share showed no net change over the period, but after 1979 labour productivity outstripped wages, causing an increase in the profit share (see Table 1, A).

Interestingly, part of the reason for the slow increase in the real wage after 1979 is attributable to the faster increase in the CPI than the GDP deflator. The annual increase in the CPI was 0.5 percentage points greater than that of the GDP deflator. If ‘real wages’ were defined as wages deflated by the GDP price index, then real wages would have increased at 0.7% per annum, close to that of labour productivity. The faster increase in the CPI than in the GDP deflator probably reflects slower productivity growth in the production of consumer goods and services, compared with investment or export products.

The rate of increase of the capital–labour ratio, on the other hand, shows an almost continuous slowdown over time. The rate of change in the labour content of capital (as reflected in the price of capital as a ratio to average wages) shows no clear trend over time. Between 1947 and 1957, the capital–labour ratio grew by 2.5% per year, whereas the ratio of the price of capital to wages fell by 1.7% per year, causing a sharp increase in the organic composition (see Table 1, B). From 1957 to 1966, the latter declined at its fastest rate while the capital–labour ratio grew at about the same rate, and the organic composition fell. Between 1966 and 1970, capital–labour growth was much stronger than the productivity growth in producing capital, causing a sharp jump in the organic composition, and from 1979 to 1997, declines in the labour value of constant capital outpaced increases in the capital–labour ratio, causing the organic composition to fall once again.

The rate of profit tends to move inversely to the organic composition (see Table 1, C). When the organic composition falls, the rate of profit usually rises. The main reason for this result is that the profit share fluctuates much less over time than the organic composition.

The second decomposition of the profit rate (Table 1, D) is a bit more illuminating. Here it is apparent that the two dominant effects on movements in the net rate of profit come from changes in the real wage and the growth in overall labour productivity. Both

Table 1. Decomposition of changes in the net rate of profit by period, 1947–97 (%)

	1947–57	1957–66	1966–79	1979–97	1947–97
<i>(A) Net profits/total wages</i>					
Actual change in net profits/wages (% points)	-2.0	5.7	-3.9	3.5	3.3
% point contribution:					
Change in wage/GDP deflator ratio	-37.1	-29.5	-19.4	-16.0	-112.7
Change in labour productivity	35.1	35.3	15.5	19.4	116.0
<i>(B) Organic composition</i>					
Actual change in organic composition	0.15	-0.16	0.46	-0.29	0.16
Contribution of:					
Change in capital/labour ratio	0.50	0.38	0.41	0.33	1.69
Change in p_k/w	-0.35	-0.54	0.05	-0.63	-1.53
<i>(C) Net rate of profit</i>					
Actual change profit rate (% points)	-2.2	4.2	-5.4	3.6	0.2
% point contribution:					
Change in profits/wages ratio	-1.0	2.9	-1.9	1.6	1.7
Change in organic composition	-1.2	1.3	-3.6	2.0	-1.4
<i>(D) Net rate of profit</i>					
Actual change profit rate (% points)	-2.2	4.2	-5.4	3.6	0.2
% point contribution:					
Change in wage/GDP deflator	-18.8	-15.0	-9.2	-7.2	-56.9
Total technology effect	16.6	19.2	3.8	10.9	57.1
Change in labour productivity	17.8	17.9	7.4	8.8	58.5
Change in capital/labour ratio	-4.0	-3.3	-3.1	-2.3	-14.7
Change in p_k/w ratio	2.8	4.6	-0.4	4.4	13.3
<i>Addendum: Average annual rate of growth</i>					
Real wage (CPI deflator)	3.1	2.5	0.8	0.2	1.3
Wage/GDP deflator ratio	2.8	2.4	1.1	0.7	1.5
CPI/GDP deflator ratio	-0.3	0.0	0.3	0.5	0.2
Labour productivity	2.6	2.9	0.9	0.8	1.6
Capital/labour ratio	2.5	2.1	1.5	0.8	1.6
Capital price level/wages (p_k/w) ratio	-1.7	-3.0	0.2	-1.6	-1.4

Note: The decomposition is based on equations (8)–(10). Average period weights are used. See the Appendix for definitions of variables.

these effects have tailed off over time, with productivity growth outrunning wages since 1979. The effects of a rising capital–labour ratio on the profit rate have also fallen off steadily over time, and the effect of the falling labour content of capital (falling ratio of the capital price to wages) also declined after 1966. If we aggregate the labour productivity effect, the capital–labour ratio effect, and the effects of a changing labour content of capital (itself a result primarily of rising productivity growth in the manufacture of capital goods) into a single technology effect, then it is clear that the combined technology effect has plummeted between the 1957–66 and 1966–79 periods, though it did recover somewhat in the post-1979 period. In sum, the two dominant causes for the recent rise in profitability since the early 1980s are the slowdown in the growth of real wages and the marked slowdown in the increase in the capital–labour ratio.

4. Sectoral decomposition of the organic composition of capital, 1947–97

As noted in the Introduction, Marx argued that one possible offsetting factor to a rising organic composition of capital is the shift of capital to the relatively more labour-intensive sectors of the economy. We explore this effect in this section.

It should be noted at the outset that sectoral shifts of capital may have other effects on the rate of profit. For example, capital may also shift to sectors with higher profit rates, with higher profit shares, with lower wages, with different productivity levels or with different productivity growth rates. Any of these shifts may also affect the overall profit rate and its movement over time. However, there is reason to believe that forces of competition will, at least, tend to equalise profit rates and wage rates across sectors, at least in the long run. However, there is no reason for capital–labour ratios to equalise across sectors, since they are technology specific. Therefore, in a secular analysis, it makes sense to limit the decomposition analysis to differences in both capital intensity and organic composition among sectors of the economy.

We can formally analyse this effect as follows. The organic composition of sector j , θ_j , is given by

$$\theta_j = p_k \mathbf{K}_j / w \mathbf{L}_j = \tau_j (p_k / w) \quad (12)$$

where $\tau_j = \mathbf{K}_j / \mathbf{L}_j$ is the capital–labour ratio in sector j . Moreover, the economy-wide organic composition can now be seen as a weighted sum of the organic compositions of the individual sectors, where the weights are the labour shares s

$$\theta = \sum s_j \theta_j \quad (13)$$

In like fashion, the economy-wide capital–labour ratio is also given as a weighted sum of the capital–labour ratios of each industry, where the weights are employment shares

$$\tau = \sum s_j \tau_j \quad (14)$$

Table 2 shows the capital–labour ratios by major sector and year. There is considerable variation in the capital–labour ratios of the various sectors. In 1997, for example, they ranged from a low of \$11,000 (in 1992 dollars) per worker in construction to a high of \$1,061,000 per worker in public utilities. The coefficient of variation in industry capital–labour ratios, defined as the ratio of the standard deviation to the unweighted mean, was quite high in each of the six years, ranging from 2.04 to 2.15. This indicates that changes in sectoral composition could induce major changes in the overall capital–labour ratio. The coefficient of variation is relatively stable over time, indicating no tendency for capital–labour ratios among industries to either converge or diverge.

Over the 1947–79 period, the capital–labour ratio increased in all 12 major sectors, and rose in almost every sub-period as well. Over these years, it rose most rapidly in agriculture, mining, communications and wholesale trade, and slowest in construction, transportation, and Finance, insurance and real estate. Between 1979 and 1997, growth in capital intensity slowed down substantially. In nine of the 12 major sectors, the growth in the capital–labour ratio was down from its 1947–79 level and in three (agriculture, construction and transportation) it was negative.

Table 2 (B) shows similar statistics for sectoral organic compositions. There is also considerable variation in the organic composition among sectors. In 1997, it ranged from a low of 0.3 in construction to a high of 13.0 in mining. The coefficient of variation was

Table 2. Capital-labour ratio and organic composition of capital by sector and year, 1947-97

	1947	1957	1966	1979	1997	1947-79	1979-97	1947-97
<i>(A) Capital-labour ratio</i>								
Agriculture, forestry, and fishing	17	35	66	118	101	6.0	-0.9	3.5
Mining	108	196	358	341	655	3.6	3.6	3.6
Construction	8	10	13	16	11	2.2	-2.0	0.7
Durable manufacturing	18	23	28	41	65	2.7	2.5	2.6
Non-durable manufacturing	26	32	39	60	87	2.7	2.0	2.4
Transportation	188	199	207	200	150	0.2	-1.6	-0.5
Communications	49	80	139	231	428	4.8	3.4	4.3
Public utilities	367	522	663	824	1061	2.5	1.4	2.1
Wholesale trade	6	8	14	26	61	4.6	4.7	4.6
Retail trade	9	12	16	19	25	2.2	1.6	2.0
Finance, insurance and real estate	94	106	143	150	247	1.5	2.8	1.9
Services	8	12	16	19	20	2.6	0.2	1.7
Total private	33	42	51	62	72	2.0	0.8	1.6
Coefficient of variation	2.04	2.06	2.13	2.15	2.04			
<i>(B) Organic composition</i>								
Agriculture, forestry and fishing	1.50	3.56	4.40	7.65	5.00	5.1	-2.4	2.4
Mining	5.18	7.23	9.17	10.34	13.02	2.2	1.3	1.8
Construction	0.36	0.40	0.39	0.50	0.32	1.1	-2.4	-0.2
Durable manufacturing	0.90	0.95	0.88	1.23	1.42	1.0	0.8	0.9
Non-durable manufacturing	1.35	1.41	1.34	2.06	2.18	1.3	0.3	1.0
Transportation	7.92	7.74	6.01	5.50	4.01	-1.1	-1.8	-1.4
Communications	4.33	5.12	5.97	6.58	7.07	1.3	0.4	1.0
Public utilities	15.58	19.67	18.54	21.34	18.28	1.0	-0.9	0.3
Wholesale trade	0.35	0.44	0.56	0.88	1.32	2.9	2.3	2.7
Retail trade	0.72	0.76	0.78	1.02	1.27	1.1	1.2	1.1
Finance, insurance and real estate	5.96	5.19	5.06	5.48	4.93	-0.3	-0.6	-0.4
Services	0.73	0.86	0.82	0.87	0.59	0.5	-2.2	-0.4
Total private	1.90	2.05	1.90	2.36	2.07	0.7	-0.7	0.2
Coefficient of variation	1.80	1.93	1.83	1.60	1.72			

Note: Calculations are for the private sector only. Figures for the capital-labour ratio are in thousandsof 1992 dollars per worker. The organic composition of capital of sector j is given by $\theta_{j,t} = p_{j,t} K_{j,t} / w L_{j,t}$. The coefficient of variation is based on 55 industries.

quite high in each year, ranging from 1.72 to 1.93. Moreover, there was no tendency for the variation in sectoral organic compositions to decline (or increase) over time. The large variation indicates that shift effects are potentially very important in movements of the overall organic composition over time.

There are also considerable differences in changes in the organic composition over time among the various sectors. In only four sectors—mining, communications, wholesale trade and retail trade—did the organic composition increase in each of the five sub-periods. In agriculture, construction, public utilities and services, it rose between 1947 and 1979 and then declined between 1979 and 1997. In both durable and non-durable manu-

facturing, it increased in both periods, while in transportation and finance, insurance and real estate, it declined in both periods.

Over the entire 1947–97 period, the organic composition increased in eight sectors and declined in four—construction, transportation, Finance, insurance and real estate, and services. The organic composition showed the greatest increases in agriculture, mining and wholesale trade; it increased moderately in durable and non-durable manufacturing, communications and retail trade; and showed a slight increase or an absolute decline in the other sectors.

We can now formally decompose the effects of sectoral employment shifts on changes in the overall capital–labour ratio, the organic composition, and the rate of profit. From (14), it follows that:

$$d\tau = \sum s_j d\tau_j + \sum (ds_j)\tau_j \quad (15)$$

Table 3 (A) shows the results of this decomposition. The sectoral capital–labour effect [the first term in (15)] is positive in each of the four periods. If industry employment shares had remained constant over the entire half century, the overall capital–labour ratio would have grown three and a half times, from 33.0 to 117.4, instead of increasing by 119%, from 33.0 to 72.2.

The difference is due to shifts in the composition of employment toward more labour-intensive industries. This effect is negative in each of the periods, and the magnitude of the effect is particularly high for the 1957–66 period and especially the 1979–97 period. For the half century, the employment shift effect is only about half as great as the sectoral effect, accounting for the overall rise in the capital–labour ratio. The slowdown in growth of the overall capital–labour ratio after 1979 is due almost entirely to an acceleration of the employment shift effect.

From (13), we obtain the corresponding decomposition of the change in the organic composition:

$$d\theta = \sum s_j d\theta_j + \sum (ds_j)\theta_j \quad (16)$$

As shown in Table 3 (B), the effect of sectoral changes in the organic composition on the overall organic composition [the first term of (16)] is positive in each of the four periods. The effect is particularly strong for the 1947–57 and the 1966–79 periods. Over the entire half century, if industry employment shares had remained constant, the overall organic composition would have risen by 51%, from 1.9 to 2.9, instead of increasing by only 9%.

Employment shifts are generally toward sectors with relatively low organic compositions, except for the 1966–79 period, when the effect is more or less neutral. The employment shift effect is particularly strong for the 1957–66 and the 1979–97 periods, as it is for changes in the overall capital–labour ratio. If the organic composition had remained constant on the industry level, the overall organic composition would have fallen by 42%, instead of experiencing a small increase. Over the full half century, the sectoral effect is slightly stronger than the employment shift effect, accounting for the modest gain in the overall organic composition. The decline in the organic composition after 1979 is mainly due to the strong employment shift effect.

The movement of the rate of profit over time is due to two major effects: changes in the share of profits in value added and movements in the organic composition. The latter, in turn, is due to movements in sectoral organic composition levels and shifts in the employment shares among industries. On the basis of equations (8) and (16), we can separate out the effects of shifts in employment composition on the movement of the overall rate of profit. The results are shown in Table 3 (C).

Table 3. *The effects of sectoral shifts on changes in the capital-labour ratio. Organic composition, and rate of profit by period, 1947-97*

	1947-57	1957-66	1966-79	1979-97	1947-97
<i>(A) Capital-labour ratio^a</i>					
Actual change	9.3	8.9	10.9	10.0	39.2
Contribution of:					
change in sectoral θ_j	13.0	17.2	15.0	29.8	84.4
employment shift Δs_j	-3.6	-8.2	-4.1	-19.8	-45.1
<i>(B) Organic composition of capital^b</i>					
Actual change	0.15	-0.16	0.46	-0.29	0.16
Contribution of:					
change in sectoral θ_j	0.31	0.09	0.40	0.12	0.96
employment shift Δs_j	-0.16	-0.24	0.06	-0.41	-0.80
<i>(C) Net rate of profit^c</i>					
Actual change (% points):	-2.2	4.2	-5.4	3.6	0.2
% point contribution:					
Change in profits/wages ratio	-1.0	2.9	-1.9	1.6	1.7
Change in sectoral θ_j	-2.5	-0.7	-3.1	-0.8	-8.3
Employment shift Δs_j	1.3	2.1	-0.5	2.9	6.9

Note: Calculations are for the private sector only. See the Appendix for definitions of variables.

^a In thousands of 1992 dollars per PEP. See equation (15) for decomposition.

The results show rather persuasively that structural shifts were an important offset to rising organic composition on the industry level. Over the entire half century, rising organic composition on the industry level would have caused the net rate of profit to fall by 8.3 percentage points if employment shares had remained constant. The shift in employment toward the more labour intensive industries almost fully counteracted the increase in the organic composition on the industry level—by itself, responsible for an 6.9 percentage point increase in the net rate of profit. The employment effects are again strongest in the 1957-66 and 1979-97 periods. In the 1979-97 period, modest increases in the organic compositions on the sectoral level, coupled with employment shift effects and a rising profit share in income, led to a resurgence in the rate of profit.

5. Conclusions

Movements in the rate of profit are attributable to technological factors (changes in capital intensity, productivity growth and relative price movements) and structural factors (shifts in employment among sectors), as well as to changes in the profit and wage shares. In the last part of the analysis, I divide the post-World War II years into three epochs: 1947-66, 1966-79 and 1979-97. The first is a period of rising profitability, the second a period of declining profitability, and the third one of recovery in the profit rate (see Table 4).

During the first of these three periods, the net rate of profit increased by 2.0 percentage points. The primary reason is a substantial rise in the profit share (2.1 percentage points), since the overall organic composition remained almost unchanged. Moreover, real wages increased at almost the same rate as labour productivity. The fact that the relative price of consumer goods was falling (by 0.2% per year relative to other components of GDP)

Table 4. Summary table of factors affecting the change in the net rate of profit over three periods: 1947–66, 1966–79 and 1979–97

	1947–66	1966–79	1979–97
<i>(A) Net profits</i>			
Change in net rate of profit (% points)	2.0	-5.4	3.6
Change in net profit share (% points)	2.1	-2.2	1.9
Change in organic composition	-0.01	0.46	-0.29
Annual growth in net labour productivity less real wages (% per annum)	-0.04	0.09	0.60
<i>(B) Technological and structural effects</i>			
Annual % change in CPI/GDP deflator	-0.19	0.31	0.46
Annual % growth in capital/labour ratio	2.32	1.49	0.83
(i) with fixed industry employment shares	3.37	1.86	2.10
(ii) employment shift effect	1.05	0.38	1.27
Annual % change in the price of capital goods relative to nominal wages (p_k/w)	-2.34	0.19	-1.57

Note: Calculations are for the private sector only. See the Appendix for definitions of variables.

allowed real wages to rise in line with productivity and the profit share to increase at the same time.

During the second period, the net rate of profit fell substantially (by 5.4 percentage points). The net profit share fell by 2.2 percentage points. However, real wages increased at about the same rate as labour productivity, as it had in the previous period. In this case, rising consumer prices (by 0.4% per year relative to GDP) allowed real wages to rise in step with productivity and the profit share to decline simultaneously.

The organic composition also rose sharply, which acted as another contributory cause to the falling rate of profit. Interestingly, this was not due to an acceleration in the capital–labour ratio, whose growth rate actually fell from 2.3% per year in the preceding 19-years to 1.5% per year. Instead, the price of capital goods valued in wage terms, which had declined by a robust 2.3% per year in the 1947–66 period, increased by 0.2% per year in the 1966–79 period and allowed for a sharp rise in the organic composition, despite a slowdown in capital–labour growth.

In the most recent period, profitability rebounded by 3.6 percentage points. The net profit share also rose, by 1.9 percentage points. In this period, real wages increased less rapidly than labour productivity. The average price of consumption goods continued to rise relative to the GDP deflator, but not enough to offset the gap between labour productivity and real wage growth. During this period the organic composition also declined, contributing to the rise in the profit rate. The fall in the organic composition resulted from both a marked slowdown in the growth of the capital–labour ratio, which fell to only 0.8% per year, and another large decline in the price of capital goods relative to nominal wages (at 1.6% per year).

Structural change, particularly the shift of employment toward labour intensive services, acted as an important offset to the tendency of the rate of profit to fall. The effect was particularly strong in the 1947–66 period and again in the 1979–97 period—reducing the growth of the capital–labour ratio by 1.1% per year in the former period and by 1.3% per year in the latter period. Without it, the net profit rate would have fallen by 8 percentage points over the half century.

The recent rise in profitability can thus be traced to two events special to this period. The first is that real wages grew more slowly than labour productivity and the second is that structural shifts in employment led to very low growth in the overall capital–labour ratio. How do we interpret these two events?

With regard to the latter, Marx himself argued that new lines of production usually start out with low capital intensity and then gradually become more capital intensive over time. The relative growth of these labour intensive (mainly, service) industries will thus lower the overall growth in the capital–labour ratio. However, it is also possible that a low rate of investment itself might cause more rapid growth in labour intensive sectors, since capital-intensive firms may face a shortage of needed new capital to expand.

The first may reflect changing power relations in the economy between capital and labour. In particular, a reasonable presumption might be that an equal division of power between capital and labour should lead to real wages' increasing at about the same rate as overall labour productivity. If wages increase more slowly, we might suspect that the balance of power has shifted toward capital, and conversely. There are, of course, other legitimate interpretations of how the respective strength of capital and labour may be manifested. An alternative is that changes in the profit and wage shares themselves are indicative of the division of power—that is, the norm is a constant profit share and changes in the real wage reflect relative price movements. Weisskopf (1979) discusses these issues at great length. However, by either account, one must conclude that economic and political power shifted in favour of capital, beginning in the early 1980s.

What explains this shift in power? This topic is beyond the scope of the current paper. However, some possible causes and manifestations of this phenomenon are as follows: The first is the decline in the unionisation rate. Though this has been going on since 1953, it accelerated during the 1980s. A related event is Ronald Reagan's dismissal of unionised air controller workers during the 1982 PATCO strike, which further weakened organised labour. A second is the falling value of the minimum wage in real terms, which started in 1968 and again accelerated during the 1980s due to the high inflation rate. A third is growing international trade since the end of Bretton-Woods in 1973 and the consequent downward pressure on the wages of American manufacturing workers from rising imports. A fourth piece of evidence is the corporate downsizing and increased outsourcing of production to less developed countries which began in the 1980s. See Wolff (1999) for a review of the literature.

Indeed, Gordon (1996) argued that the decline of unions in the American economy and the decline in the real value of the minimum wage were part of a broader range of institutional changes in the 1980s in which American corporate managers exerted increasing pressure on workers, partly in reaction to rising international competition. Gordon further documented the declining real wage of American workers and argued that the growing power of management and the concomitant decline in worker power were largely responsible for this trend.

Other factors that may have played a role are the wage and price controls introduced during the Nixon administration and the role of monetary policy. Nilsson (2001) argues, for example, that the imposition of wage and price controls between August 1971 and April 1974 did a better job in restricting wages and helped lead to the decline in real wages after 1973. Dumenil and Lévy (2000B) point to the growing power of the Federal Reserve Board, starting in the early 1980s, and the gradual ascendancy of monetary policy over fiscal policy as one factor leading to a rise in profitability.

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Appendix: Data sources and definitions of variables

Data are from the Bureau of Economic Analysis’ National Income and Product Accounts and Net Stock of Fixed Reproducible Tangible Capital accounts, provided on the Internet. The calculations are for the private (non-governmental) sector, unless otherwise indicated. Key:

PBT: corporate profits before tax

PI: proprietors’ income

PTI: gross property-type income, defined as the sum of corporate profits, the profit portion of proprietors' income, rental income of businesses, business net interest, capital consumption allowances, business transfer payments, and the current surplus of government enterprises less subsidies. Proprietors' income includes both labour income and a return on capital. The labour portion is estimated by multiplying the number of self-employed workers by the average employee compensation of salaried workers. The profit portion is the residual part of proprietors' income.

CCCA: corporate capital consumption allowance

NCCA: non-corporate capital consumption allowance

GDP: current dollar gross domestic product

COMP: compensation of employees, which consists of wage and salary accruals, employer contributions for social insurance, and other labour income

PEP: persons engaged in production, which equals the number of full-time and part-time employees plus the number of self-employed persons

NETK: current-cost net stock of fixed reproducible tangible non-residential private capital stock. See Katz and Herman (1997) for a description of the methodology used in constructing the capital stock data.

NETKC: current-cost net stock of fixed reproducible tangible non-residential capital stock, corporate sector only

GROSSK: current-cost gross stock of fixed reproducible tangible non-residential private capital stock

NNI: net national income, defined as $COMP + PTI - CCCA - NCCA$

GNI: gross national income, defined as $COMP + PTI$. GNI equals GDP less indirect business tax and non-tax liability

Net profit share = $(PTI - CCCA - NCCA) / NNI$

Corporate net profit rate = $PBT / NETKC$

Net profit rate, private economy = $(PTI - CCCA - NCCA) / NETK$

Gross profit share = PTI / GNI

Gross profit rate, private economy = $PTI / GROSSK$

